

CLAIMS

1. A method for use in a packet retransmission scheme in a mobile communication system comprising a communication terminal and a plurality of base stations, wherein said communication terminal is in communication with said plurality of base stations during a soft handover, the method comprising the steps of:

receiving a data packet from the communication terminal at the plurality of base stations,

checking data integrity of said received data packet at each of the base stations,

if data integrity of said received data packet was not confirmed by a base station, storing the received data packet in a region of a buffer of the respective base station, wherein the buffer region is associated with said received data packet and monitoring the time elapsed since the storing of said data packet in said associated buffer region.
2. The method according to claim 1, further comprising the step of:

if data integrity of said received data packet was confirmed, flushing the associated buffer region.
3. A method for updating the soft buffer of a base station in a mobile communication system comprising a communication terminal and a plurality of base stations, wherein said communication terminal is in communication with said plurality of base stations during a soft handover, the method comprising the steps of:

receiving a data packet from the communication terminal at the plurality of base stations,

checking data integrity of said received data packet at each of the base stations, and

if data integrity of said received data packet was confirmed, flushing a buffer region of the respective base station associated with said received data packet..
4. The method according to claim 3, further comprising the step of:

if data integrity of said received data packet was not confirmed by a base station, storing the received data packet in the associated buffer region, and monitoring

the time elapsed since the storing of said data packet in said associated buffer region.

5. The method according to claim 1, 2 or 4, further comprising the step of:

flushing a buffer region, if the respective monitored time period is equal to or larger than a threshold time period after which a retransmission data packet can no longer be expected in the respective base station.
6. The method according to claim 1, 2, 4 or 5, further comprising the step of:

receiving a retransmission data packet from the communication terminal at the plurality of base stations,

performing a data integrity check of said received retransmission data packet at each of the base stations,

if data integrity was not confirmed by a base station, storing the retransmission data packet in the buffer region associated with a previous data packet relating to said retransmission data packet, and restarting said monitoring the time elapsed since the storing of the retransmission data packet in said associated buffer region.
7. The method according to claim 6, wherein the step of performing the data integrity check comprises:

combining said retransmission data packet with said related data packet to obtain a combined data packet,

decoding the combined data packet to obtain decoded data, and

checking the integrity of the decoded data.
8. The method according to one of claims 1 to 7, further comprising the step of:

receiving a retransmission data packet from the communication terminal at the plurality of base stations,

performing a data integrity check of said received retransmission data packet at each of the base stations,

if data integrity was confirmed by a base station, stopping the monitoring of the associated buffer region.

9. The method according to one of claims 1 to 8, further comprising the step of:

if the respective monitored time period is equal to or larger than a threshold time period, stopping the monitoring of the respective data packet.
10. The method according to one of claims 1 to 9, wherein said threshold time period is of configurable duration.
11. The method according to claim 10, further comprising the step of:

signaling the duration of said threshold time period to at least one of said plurality of base stations by radio network control signaling from a control unit in the mobile communication network.
12. The method according to claim 11, wherein the duration of said threshold time period is signaled to the at least one base station in an information element of a NBAP message.
13. The method according to one of claims 10 to 12, further comprising the step of:

signaling the duration of said threshold time period to said communication terminal by radio resource control signaling from a control unit in the mobile communication network.
14. The method according to claim 13, wherein the duration of said threshold time period is signaled to the communication terminal in an IE of at least one of a radio bearer setup message, radio bearer reconfiguration message, radio resource control connection setup message, transport channel reconfiguration message, cell update message, and a handover command message.
15. The method according to one of claims 1 to 14, further comprising the step of:

transmitting a message from at least one of said plurality of base stations to the communication terminal indicating whether at least one of said plurality of base stations confirmed data integrity of the received data packet.

16. The method according to one of claims 1 to 15, further comprising the step of:

forwarding the received data packet to a control unit of the mobile communication system by at least one of the base stations that did confirm data integrity of the received data packet.
17. The method according to one of claims 1 to 16, further comprising the step of:

receiving a capacity request message from said communication terminal at a base station requesting additional transmission capacity for a retransmission of a data packet.
18. The method according to claim 17, wherein said capacity request message comprises at least one of a transmission priority of a data packet to be transmitted by said communication terminal, the size of data in a transmission buffer of said communication terminal, the duration of said monitored time period, the identification of the packet, or the channel for which capacity is requested.
19. The method according to claim 17 or 18, further comprising the step of:

transmitting a capacity grant message from a base station to said communication terminal, wherein the capacity grant message indicates a transmission capacity assigned to said communication terminal for data transmission.
20. The method according to one of claims 1 to 19, wherein the data packet is received via a dedicated channel.
21. The method according to one of claims 1 to 20, further comprising the steps of:

receiving a restart request message from said communication terminal at a base station, wherein said restart request message indicates a data packet for which monitoring of said time elapsed since the storing of said data packet in said associated buffer region has to be restarted, and

restarting said monitoring.
22. The method according to claim 21, wherein said restart request message comprises control information and no or dummy payload data.
23. The method according to one of claims 1 to 22, wherein said packet retransmission scheme is a window based packet retransmission scheme, and

the method further comprises the step of calculating said threshold time period based on the time required for the transmission of all data packets within a window of the packet retransmission scheme.

24. The method according to claim 1 to 23, further comprising the step of:

calculating said threshold time period based on the time interval between the reception of an initial data packet and the reception of a retransmission data packet.

25. The method according to one of claims 1 to 22, further comprising the step of:

calculating the duration of said threshold time period based on at least one of the size of said buffer, the maximum number of packet retransmissions in a data packet retransmission scheme, the communication terminal's processing time for a feedback message, the respective base station's processing time for a received data packet and a transmission time interval.

26. A base station in a mobile communication system comprising a communication terminal and a plurality of base stations, wherein the communication terminal is in communication with said plurality of base stations during a soft handover, and wherein said base station comprises means for implementing the method according to one of claims 1 to 25.

27. A method for scheduling data retransmissions in a communication terminal being part of a mobile communication system comprising said communication terminal and a plurality of base stations, wherein said communication terminal is in communication with said plurality of base stations during a soft handover, the method comprising the steps of:

transmitting a data packet to said plurality of base stations,

receiving at least one feedback message from at least one of said base stations,

evaluating said at least one feedback message to determine whether data integrity of said transmitted data packet was confirmed by at least one of said plurality of base stations, and

if data integrity of said transmitted data packet was not confirmed by a base station, monitoring the time period elapsed since the transmission of said data

packet or the reception of the respective feedback message, to schedule a retransmission relating to said data packet to occur not after expiry of a threshold time period after which a reception of a retransmission data packet can no longer be expected in the respective base station.

28. The method according to claim 27, further comprising the step of:

if data integrity of said transmitted data packet was not confirmed and at a point in time where said monitored time period is smaller than the threshold time period, transmitting a capacity request message to said plurality of base stations requesting further transmission capacity for a retransmission of a data packet.

29. The method according to claim 28, wherein said capacity request message comprises at least one of a transmission priority of a data packet, the size of data in a transmission buffer of said communication terminal, the duration of said monitored time period, the identification of the packet,, and the channel for which capacity is requested..

30. The method according to claim 28 or 29, further comprising the steps of:

checking if a capacity grant message was received from a base station of said plurality of base stations, wherein the capacity grant message indicates a transmission capacity assigned to said communication terminal for data transmissions, and

if said capacity grant message has not been received, transmitting a restart request message to a base stations, wherein said restart request message indicates a data packet for which monitoring at the respective base station has to be restarted.

31. The method according to claim 27, further comprising the steps of:

if data integrity of said transmitted data packet was not confirmed and at a point in time where said monitored time period is smaller than the threshold time period, transmitting a restart request message to a base stations, wherein said restart request message indicates a data packet for which monitoring at the respective base station has to be restarted.

32. The method according to claim 31, wherein said restart request message comprises control information and no or dummy payload data.

33. The method according to claim 27, further comprising the step of:
- if data integrity of said transmitted data packet was not confirmed and at a point in time where said monitored time period is smaller than the threshold time period, stalling the retransmissions a data packet until the respective monitored time period is larger than said threshold time interval.
34. The method according to one of claims 27 to 33, further comprising the step of:
- if data integrity of the transmitted data packet was not confirmed, informing a scheduler in the communication terminal to reschedule the transmitted data packet for retransmission.
35. The method according to one of claims 27 to 34, further comprising the steps of:
- transmitting a retransmission data packet to said plurality of base stations,
- receiving at least one feedback message from at least one of said base stations,
- evaluating said at least one feedback message to determine whether data integrity of said transmitted retransmission data packet was confirmed by at least one of said plurality of base stations, and
- if data integrity was confirmed, stopping the monitoring of said time elapsed since the transmission of the a data packet or the reception of a respective feedback message.
36. The method according to one of claims 27 to 35, further comprising the step of:
- if data integrity for the transmitted data packet was confirmed, informing said scheduler to remove said transmitted data packet from a transmission buffer of the communication terminal.
37. A communication terminal in a mobile communication system comprising the communication terminal and a plurality of base stations, wherein the communication terminal is in communication with said plurality of base stations during a soft handover, and wherein said communication terminal comprises means for implementing the method according to one of claims 27 to 36.
38. A mobile communication system comprising a plurality of base stations according to claim 26 and at least one communication terminal according to claim 37.